WE CLAIM:

1. A rechargeable electrochemical cell defining a positive and a negative terminal, the cell comprising:

(a) an outer can defining an internal cavity, and a positive and negative electrode disposed in the internal cavity; and

(b) a switch assembly including:

i. a flexible member comprising a material having a heat deflection temperature greater than 100 C at 264 PSI and a tensile strength greater than 75Mpa, wherein the flexible member flexes from a first position towards a second position in response to internal cell pressure;

ii. a first conductive element in electrical communication with the positive terminal;

iii. a second conductive element in electrical communication with the positive electrode, and in removable electrical communication with the first conductive element, wherein the second conductive element is in mechanical communication with the flexible member; and

wherein the first and second conductive elements are removed from electrical communication when the flexible member flexes towards the second position in response to an internal pressure exceeding a predetermined threshold.

2. The electrochemical cell as recited in claim 1, wherein the flexible member returns to the first position from the second position when the internal pressure drops below the predetermined threshold.

3. The electrochemical cell as recited in claim 1, wherein the flexible member material is selected from the group consisting of a glass filled polyamide and an aromatic polyamide.

4. The electrochemical cell as recited in claim 3, wherein the glass filled polyamide is selected from the group consisting of glass filled nylon 6,6, glass filed nylon 6,12, and glass filed polyphthalamide.

5. The electrochemical cell as recited in claim 4, wherein the glass filled polyamide has a glass content between 1% and 50% by mass.

6. The electrochemical cell as recited in claim 5, wherein the glass filled polyamide has a glass content between 5% and 12% by mass.

7. The electrochemical cell as recited in claim 1, wherein the flexible member material has a tensile strength greater than 75Mpa, and less than a 50% elongation at break

8. The electrochemical cell as recited in claim 1, wherein the flexible member material has a heat deflection temperature greater than 120 C at 264 PSI.

9. The electrochemical cell as recited in claim 3, wherein the aromatic polyamide comprises polyphthalamide.

10. The electrochemical cell as recited in claim 1, further comprising a separator, disposed between the positive and negative electrodes, wherein the separator comprises a polypropylene.

11. The electrochemical cell as recited in claim 1, wherein one of the positive and negative electrodes include an inert material.

12. The electrochemical cell as recited in claim 11, wherein the inert material comprises a layer that is inserted into at least one of the positive and negative electrodes.

13. The electrochemical cell as recited in claim 11, wherein the inert material is intermixed within at least one of the positive and negative electrodes.

14. The electrochemical cell as recited in claim 11, wherein the cumulative volume of positive and negative electrode material is reduced between 20% and 40%.

15. The electrochemical cell as recited in claim 11, wherein the electrochemical cell is a size AA cell having a discharge capacity between 700 and 1600 mAh.

16. The electrochemical cell as recited in claim 11, wherein the electrochemical cell is a size AAA cell having a discharge capacity between 200 and 650 mAh.

17. The electrochemical cell as recited in claim 1, wherein the cell is a nickel metal hydride cell.

18. The electrochemical cell as recited in claim 17, wherein the cell is a small format cell.

19. The electrochemical cell as recited in claim 17, wherein the cell is a large format cell.

20. The electrochemical cell as recited in claim 1, wherein the internal cavity defines an open end, the cell further comprising a terminal end cap enclosing the open end.

21. The electrochemical cell as recited in claim 20, wherein the flexible member divides the internal cavity into a cell interior and an end cap interior, and wherein a channel extends axially through the flexible member linking the internal cavity with the cell interior.

22. The electrochemical cell as recited in claim 21, further comprising a conductive rivet extending through the channel and a conductive tab electrically connecting the rivet to the positive electrode, wherein the rivet is in electrical communication with the second conductive element.

23. The electrochemical cell as recited in claim 22, wherein at least one of the rivet and the conductive tab comprise a nonferrous alloy material.

24. The electrochemical cell as recited in claim 23, wherein the nonferrous alloy material is selected from the group consisting of beryllium-copper, a silver plated electrical contact, a gold plated contacts, nickel, and a nickel plated contact.

25. The electrochemical cell as recited in claim 24, wherein the contact comprises steel.

26. The electrochemical cell as recited in claim 21, further comprising an outlet extending through the terminal end cap.

27. The electrochemical cell as recited in claim 26, further comprising a venting member that blocks the channel while the flexible member is in the first position.

28. The electrochemical cell as recited in claim 27, wherein the venting member becomes removed from the channel in response to a predetermined internal pressure threshold.

29. The electrochemical cell as recited in claim 28, wherein the predetermined internal pressure threshold is substantially equal to the internal pressure threshold that biases the flexible member to the second position.

30. The electrochemical cell as recited in claim 28, wherein the predetermined internal pressure threshold is greater than the internal pressure threshold that biases the flexible member to the second position.

31. The electrochemical cell as recited in claim 28, wherein the venting member comprises a plug disposed in the channel that is removed from the channel in response to internal pressure.

32. The electrochemical cell as recited in claim 31, wherein the internal pressure biases the plug into the end cap interior.

33. The electrochemical cell as recited in claim 31, wherein the plug is attached to the terminal end cap, and wherein the channel is removed from the plug when the flexible member is in the second position.

34. The electrochemical cell as recited in claim 28, wherein the venting member further comprises a transverse disc blocking fluid flow between the cell interior and the end cap interior, wherein the transverse arm breaks in response to internal cell pressure.

35. The electrochemical cell as recited in claim 1, wherein the flexible member further comprises a necked-down disc portion that fails when the internal cell pressure reaches a predetermined threshold.

36. The electrochemical cell as recited in claim 1, wherein the flexible member extends substantially laterally.

37. The electrochemical cell as recited in claim 1, wherein the flexible member extends radially inwardly from the can.

38. The electrochemical cell as recited in claim 1, wherein the flexible member is symmetrically positioned with respect to the can.

39. A battery pack comprising:

a plurality of electrochemical cells defining positive and negative terminals, at least one of the cells including:

(a) an outer can defining an internal cavity, and a positive and negative electrode disposed in the internal cavity; and

(b) a switch assembly including:

i. a flexible member that flexes from a first position towards a second position in response to internal cell pressure;

ii. a first conductive element in electrical communication with the positive terminal;

iii. a second conductive element in electrical communication with the positive electrode, and in removable electrical communication with the first conductive element, wherein the second conductive element is in mechanical communication with the flexible member; and

wherein the first and second conductive elements are removed from electrical communication when the flexible member flexes towards the second position in response to an internal pressure exceeding a predetermined threshold.

40. The battery pack as recited in claim 39, wherein the electrochemical cells are connected in series.

41. The battery pack as recited in claim 39, wherein the electrochemical cells are connected in parallel.

42. The battery pack as recited in claim 39, further comprising at least two strings of cells connected in series, wherein each string is connected in parallel.

43. The battery pack as recited in claim 39, wherein the electrochemical cells are configured to provide one of a size C and D electrochemical cell.

44. The battery pack as recited in claim 39, wherein the cell including the flexible member has a lower charge capacity than the remaining cells.

45. The battery pack as recited in claim 39, wherein all electrochemical cells further comprise elements (a) and (b).

46. The battery pack as recited in claim 39, wherein the flexible member a tensile strength greater than 75Mpa and less than a 50% elongation at break

47. The battery pack as recited in claim 39, wherein the flexible member has a heat deflection temperature greater than 120 C at 264 PSI and a tensile strength greater than 75 Mpa.

48. The battery pack as recited in claim 47, wherein the flexible member material has a heat deflection temperature greater than 200 C at 264 PSI.

49. A method of charging a battery pack as recited in claim 39, wherein the battery pack includes cells electrically connected in series, wherein one of the cells is mismatched with a higher charge capacity relative to the remaining cells connected in series, the steps comprising:

1) applying a charge through the series of cells until the flexible member in one of the cells opens;

2) removing the charge through the series of cells until the flexible member returns to the first position; and

3) reapplying the charge through the series of cells.

50. The method as recited in claim 49, wherein step (3) further comprises equalizing the charge capacity of the mismatched cell with the remaining cells.

51. The method as recited in claim 49, further comprising predetermining the cell that will open during step (1), and providing that cell with the flexible member.

52. A method of charging a battery pack as recited in claim 39, wherein the battery pack includes cells electrically connected in parallel, wherein one of the cells is

mismatched with a higher charge capacity relative to the remaining cells, the steps comprising:

1) applying a charge through the cells until the flexible member in one of the cells opens;

2) iterating the flexible member between a closed and open position; and

3) applying the charge to the higher charge capacity cell during step (2)

53. A method for charging an electrochemical cell of the type including (a) an outer can defining an internal cavity with an open end, a positive and negative electrode disposed in the internal cavity, and a terminal end cap enclosing the open end; and (b) an end cap assembly including: i. a flexible member that extends radially inwardly from the can and flexes from a first position towards a second position in response to internal cell pressure, ii. a first conductive element in electrical communication with the terminal end cap, and iii. a second conductive element in electrical communication with the positive electrode, and in removable electrical communication with the first conductive element, wherein the second conductive element is in mechanical communication with the flexible member, the steps comprising:

(A) providing a charge including at least one of a voltage level between 1.2 and 2 V and a current level between 4 and 15 A; and

(B) flexing the flexible member towards the second position to remove the first and second conductive elements from electrical communication when internal cell pressure exceeds a predetermined threshold,

54. The method as recited in claim 53, wherein step (A) further comprises providing a voltage between 1.2 and 1.65 V.

55. The method as recited in claim 54, wherein step (A) further comprises providing a voltage between 1.6 and 1.65 V.

56. The method as recited in claim 54, wherein step (A) further comprises providing a voltage between 1.2 and 1.6 V.

57. The method as recited in claim 53, wherein step (A) further comprises providing a charge voltage at a predetermined level between 1.2 and 2.0 V, and decreasing the charge voltage based on a predetermined cell characteristic.

58. The method as recited in claim 57, wherein the predetermined characteristic is cell temperature.

59. The method as recited in claim 58, wherein step (A) further comprises providing a variable voltage that is not time dependent.

60. The method as recited in claim 58, wherein step (A) further comprises providing a constant voltage that steps down after the expiration of a predetermined length of time.

61. The method as recited in claim 57, wherein step (A) further comprises preventing the applied voltage from decreasing below the predetermined level.

62. The method as recited in claim 57, wherein the predetermined level is substantially equal to 1.65 V.

63. The method as recited in claim 57, further comprising terminating step (A) upon the expiration of a predetermined duration of time.